

# E-BRAIN

## Electronics on the brain

How electronics can help with neurological disorders. Mon **12th Oct 2020**

One of the most important scientific and technological frontiers of our time is the interfacing of electronics with the human brain. This endeavour promises to help understand how the brain works and deliver new tools for diagnosis and treatment of pathologies including epilepsy and Parkinson's disease.. Recent advances in organic electronics have made available materials with a unique combination of attractive properties, including mechanical flexibility, mixed ionic/electronic conduction, enhanced biocompatibility, and capability for drug delivery. I will present examples of novel devices for recording and stimulation of neurons and show that organic electronic materials offer tremendous opportunities to study the brain and treat its pathologies.

EBRAINS is a new digital research infrastructure, created by the EU-funded Human Brain Project, that gathers an extensive range of data and tools for brain-related research.



EBRAINS' ambition is to provide the scientific community at large with an open state-of-the-art capability that fosters collaborative brain science, opens the way to ground-

breaking discovery and aims to secure Europe's leading position in the dynamically growing field of multidisciplinary brain research and its exploitation.

### Brain-Inspired Technologies:

Understand and leverage the computational capabilities of spiking neural networks



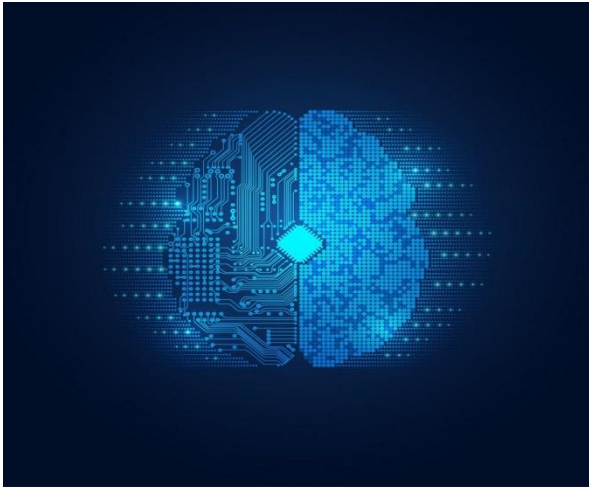
### Medical Data Analytics:

The Medical Data Analytics service provides two unique EBRAINS platforms, covering key areas in clinical neuroscience research

**Community:** Workspaces, computing and storage resources, and community networking tools that allow researchers working together and to leverage the power of the EBRAINS research infrastructure

### Collaboratory

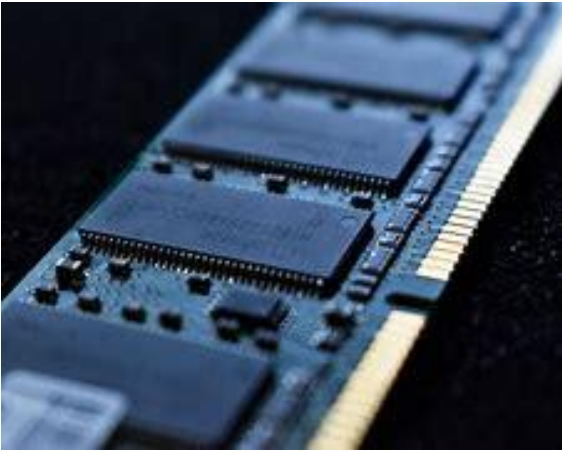
The EBRAINS Collaboratory offers researchers and developers a secure environment in which they can work with others. Many researchers are sharing their work already; several services, tools, datasets and other types of resources are publicly available, and many more are available for registered users. Join the EBRAINS community and participate in conversations and activities via the Collaboratory.



I YEAR HARISH.P.P (ECE)

## RAM

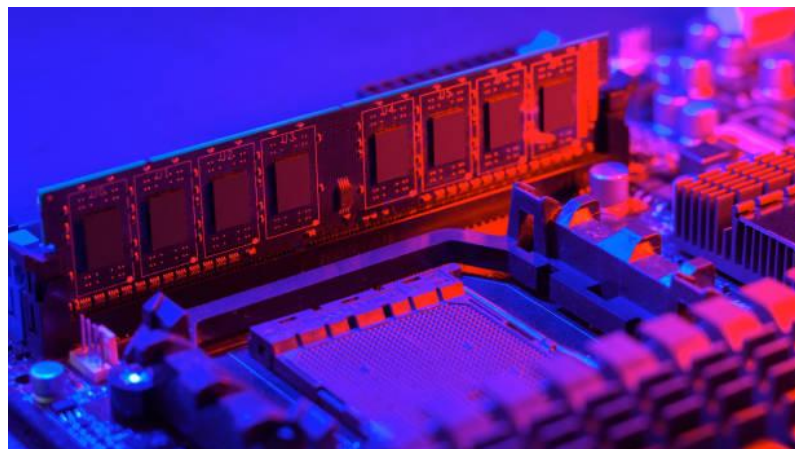
The two main types of volatile random-access semiconductor memory are static random-access memory (SRAM) and dynamic random-access memory (DRAM). Commercial uses of semiconductor RAM date back to **1965**, when IBM introduced the SP95 SRAM chip for their System/360 Model 95 computer, and Toshiba used DRAM memory cells for its Toscal BC-1411 electronic calculator, both based on bipolar transistors. Commercial MOS memory, based on MOS transistors, was developed in the late 1960s, and has since been the basis for all commercial semiconductor memory. The first commercial DRAM IC chip, the Intel 1103, was introduced in **October 1970**. Synchronous dynamic random-access memory (SDRAM) later debuted with the Samsung KM48SL2000 chip in 1992.



## Recent developments

Since **2006**, "solid-state drives" (based on flash memory) with capacities exceeding 256 gigabytes and performance far exceeding traditional disks have become available. This development has started to blur the definition between traditional random-access memory and "disks", dramatically reducing the difference in performance.

Some kinds of random-access memory, such as "**EconRAM**", are specifically designed for server farms, where low power consumption is more important than speed.

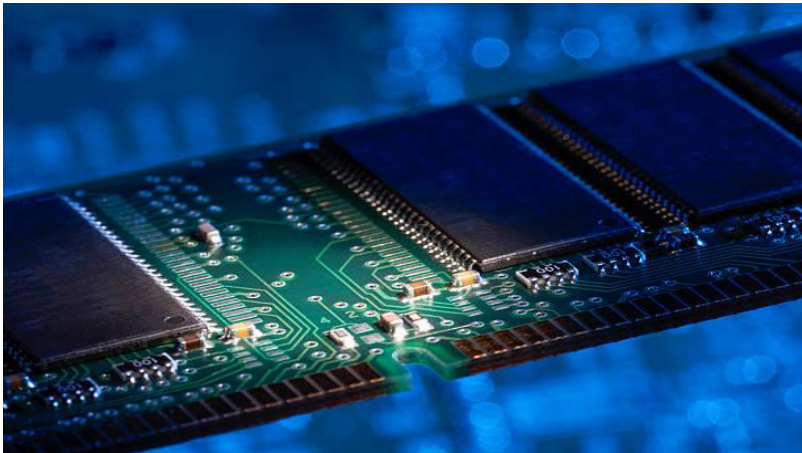


## Function of RAM

RAM can't store permanent data. RAM can be compared to a person's short-term memory, and a hard disk drive to a person's long-term memory. Short-term memory is focused on immediate work, but it can only

keep a limited number of facts in view at any one time. When a person's short-term memory fills up, it can be refreshed with facts stored in the brain's long-term memory.

A computer also works this way. If RAM fills up, the computer's processor must repeatedly go to the hard disk to overlay the old data in RAM with new data. This process slows the computer's operation



I YEAR HARISH.P.P (ECE)



# MEDITATION

Meditation is a practice in which an individual uses a technique – such as mindfulness, or focusing the mind on a particular object, thought, or activity – to train attention and awareness, and achieve a mentally clear and emotionally calm and stable state.

Swami Vivekananda

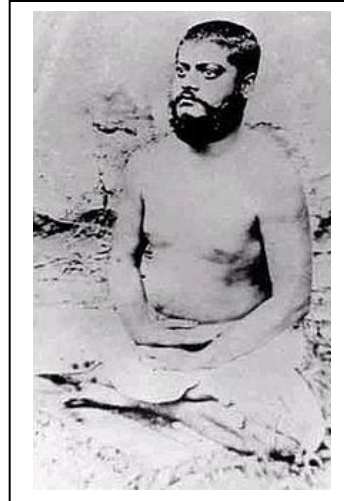
Hsuan Hua

Baduanjin qigong

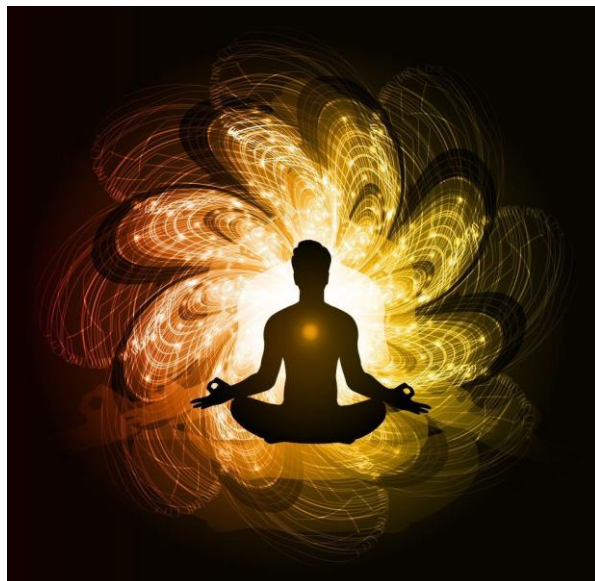
Narayana Guru

Sufis

St Francis



Various depictions of meditation the Hindu Swami Vivekananda, the Buddhist monk Hsuan Hua, Taoist Baduanjin Qigong, the Christian St Francis, Muslim Sufis in Dhikr, and social reformer Narayana Guru



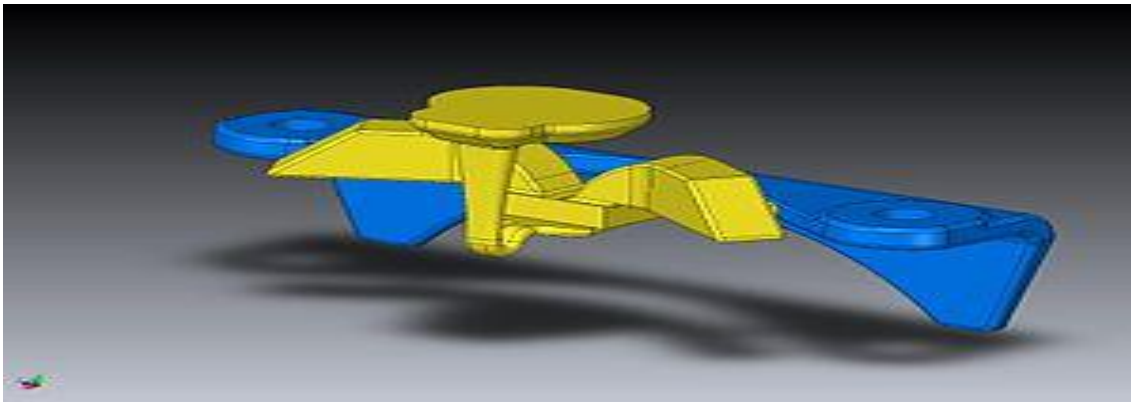
Meditation is practiced in numerous religious traditions. The earliest records of meditation are found in the Upanishads, and meditation plays a salient role in the contemplative repertoire of Jainism, Buddhism and Hinduism. Since the 19th century, Asian meditative techniques have spread to other cultures where they have also found application in non-spiritual contexts, such as business and health.



Meditation may significantly reduce stress, anxiety, depression, and pain, and enhance peace, perception, self-concept, and well-being. Research is ongoing to better understand the effects of meditation on health and other areas.

## 3D PRINTING

**3D** printing or additive manufacturing is the construction of a three-dimensional object from a CAD model or a digital 3D model. It can be done in a variety of processes in which material is deposited, joined or solidified under computer control, with material being added together (such as plastics, liquids or powder grains being fused), typically layer by layer.

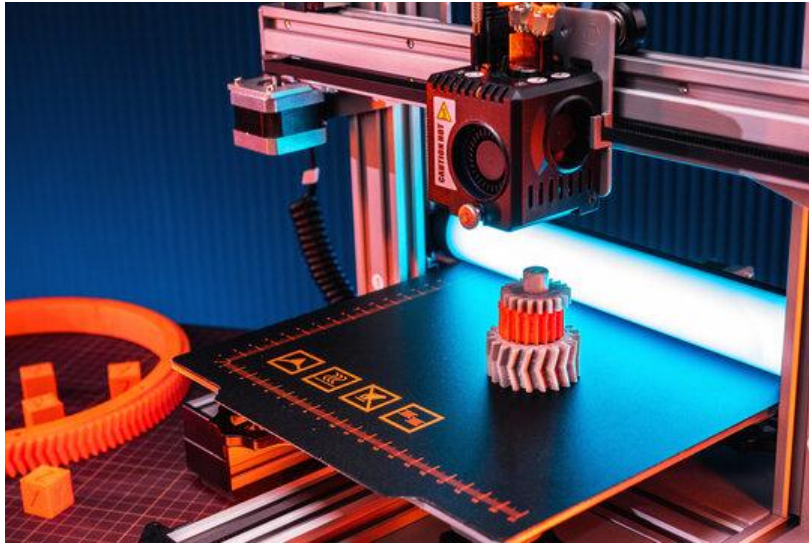


A three-dimensional printer Timelapse of a three-dimensional printer in action

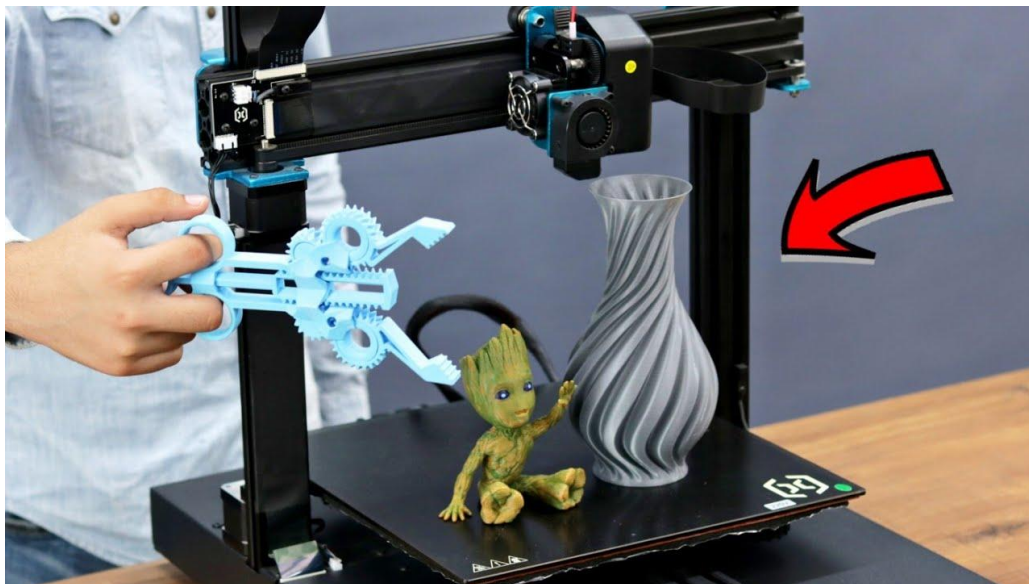
In the **1980s**, 3D printing techniques were considered suitable only for the production of functional or aesthetic prototypes, and a more appropriate term for it at the time was rapid prototyping. As of **2019**, the precision, repeatability, and material range of 3D printing have increased to the point that some 3D printing processes are considered viable as an industrial-production technology, whereby the term additive manufacturing can be used synonymously with 3D printing. One of the key advantages of 3D printing is the ability to produce very complex shapes or geometries that would be otherwise impossible to construct by hand, including hollow parts or parts with internal truss structures to reduce weight. Fused deposition modeling



(FDM), which uses a continuous filament of a thermoplastic material, is the most common 3D printing process in use as of **2020**.



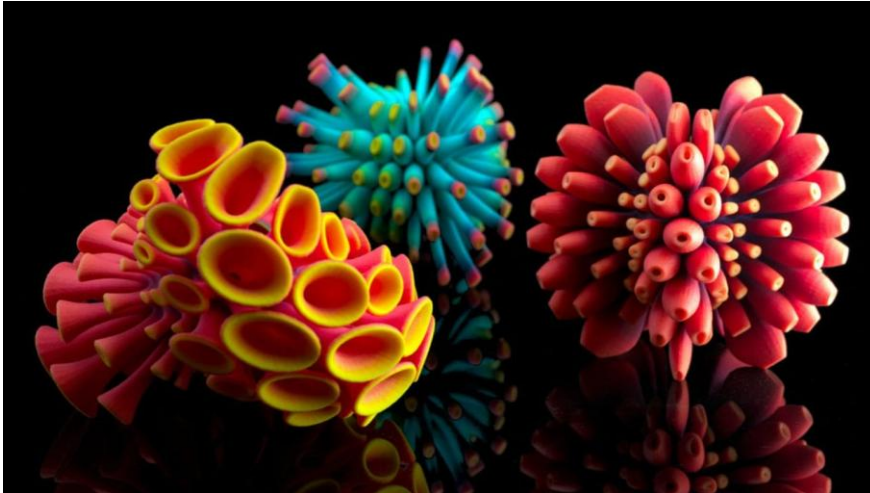
A variety of processes, equipment, and materials are used in the production of a three-dimensional object via additive manufacturing. 3D printing is also known as additive manufacturing, therefore the numerous available 3D printing process tend to be additive in nature with a few key differences in the technologies and the materials used in this process.



Computer-Aided Design (CAD) model used for 3D printing.

The manual modeling process of preparing geometric data for 3D computer graphics is similar to plastic arts such as sculpting. 3D scanning is a process of collecting digital data on the shape and appearance of a real object, creating a digital model based on it.

Some of the different types of physical transformations which are used in **3D** printing include melt extrusion, light **polymerization**, continuous liquid interface production and sintering.



I YEAR HARISH.P.P (ECE)

## RPA



Industrial Robotic Automation for Smart Manufacturing

## Industrial Robotic Automation

Learn how flexible robot workstations can help to resolve labor shortage challenges

A new industrial revolution is moving towards smart manufacturing and smart factories. To meet customer requirements for the future smart industry, there are new emerging technologies such as industrial robots designed to operate in dangerous environments that can assist in achieving flexible manufacturing, reduce manpower, and save development time.



In smart manufacturing, robot workstations can help to resolve the issue of a labor shortage as well as increase the productivity for the businesses and industries. Robot workstations can shorten production time, ensuring consistent product quality.

Industrial robots are programmed to automatically accomplish applications such as screw driving, dispensing, soldering, palletizing, assembly, and pick and place.



## Rubber and Plastic

Rubber and plastic production is a constantly growing market that requires innovative technology and energy efficient solutions in production area. We offer robotic solutions that can help the customer achieve the flexibility in production.



## Soldering

Integration of robotic solutions can perform the designated task, set by custom program, with extreme precision and repeatability. Once the program is set as per users desired quality level, the robotic solitons perform the function in same way every single time.

## Palletizing

Robotic Solutions with a built-in palletizing function can be used for to load and unload an object without spending lot of time. This can also help in increasing productivity and profitability while allowing more flexibility.

**I YEAR HARISH.P.P (ECE)**

# HEALTHCARE INDUSTRY

The healthcare industry (also called the medical industry or health economy) is an aggregation and integration of sectors within the economic system that provides goods and services to treat patients with curative, preventive, rehabilitative, and palliative care. It includes the generation and commercialization of goods and services lending themselves to maintaining and re-establishing health. The modern healthcare industry includes three essential branches which are services, products, and finance and may be divided into many sectors and categories and depends on the interdisciplinary teams of trained professionals and paraprofessionals to meet health needs of individuals and populations.



An insurance form with pills





The healthcare industry is one of the world's largest and fastest-growing industries. Consuming over 10 percent of gross domestic product (GDP) of most developed nations, health care can form an enormous part of a country's economy. U.S. health care spending grew 4.6 percent in **2019**, reaching **\$3.8** trillion or **\$11,582** per person. As a share of the nation's Gross Domestic Product, health spending accounted for 17.7 percent. The per capita expenditure on health and pharmaceuticals in OECD countries has steadily grown from a couple of hundred in the 1970s to an average of US\$4'000 per year in current purchasing power parities

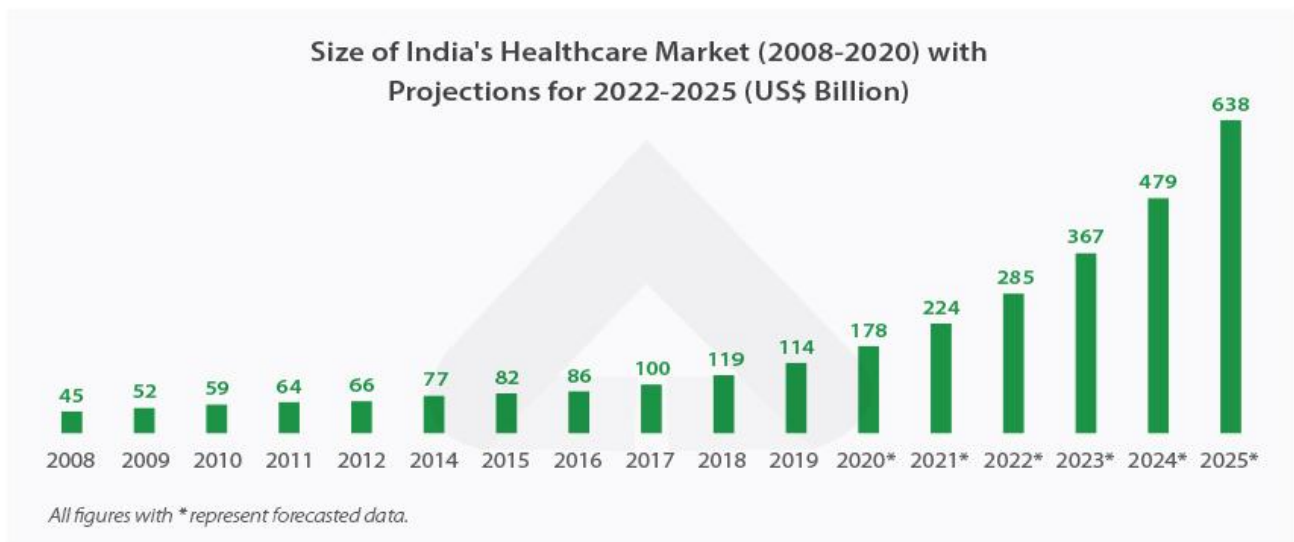
### An Overview of India's Healthcare Ecosystem

**October 20, 2022** Posted by India Briefing Written by Naina Bhardwaj Reading Time: 8 minutes

India's healthcare ecosystem is among the fastest growing sectors having benefited from government policies to make the country a global hub for health and wellness. There is huge scope for foreign investment in this area

due to a liberalized FDI regime in various sub-sectors like hospitals, medical devices, health insurance, etc.

Driven by factors like population demographics, a growing middle class, rising incomes, better health awareness, and increasing lifestyle diseases, India's healthcare market has been expanding at a compound annual growth rate (CAGR) of 22% percent. The Indian healthcare market, which was valued at US\$86 billion in **2016** is now projected to reach **US\$367** billion by 2023 and US\$638 billion by 2025 as per INC42. Data by Statista pegs this estimate at US\$372 billion by **2022**, up from US\$160 billion in **2016**.



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I YEAR HARISH.P.P (ECE)

# DANCE

Dance is a performing art form consisting of sequences of movement, either improvised or purposefully selected. This movement has aesthetic and often symbolic value. Dance can be categorized and described by its choreography, by its repertoire of movements, or by its historical period or place of origin.



A man and woman, mid-leap

Two modern dancers

An important distinction is to be drawn between the contexts of theatrical and participatory dance, although these two categories are not always completely separate; both may have special functions, whether social, ceremonial, competitive, erotic, martial, or sacred/liturgical.



Other forms of human movement are sometimes said to have a dance-like quality, including martial arts, gymnastics, cheerleading, figure skating, synchronized swimming, marching bands, and many other forms of athletics. There are many professional athletes like, professional football players and soccer players, who take dance classes to help with their skills. To be more specific professional athletes take many ballet classes because ballet is a foundation of many things we do in life. Ballet helps with balance, core strength, and leg strength.

I YEAR REVATHI.K (ECE)